

Unit 7 Trigonometry Test #1 Review

Find the value of the trig function indicated.

1) $\cos \theta$

CAH

hyp 15
adj. 9
opp

$\cos \theta = \frac{9}{15}$

$\cos \theta = \frac{3}{5}$

2) $\sin \theta$

SOH

opp $3\sqrt{23}$
hyp 16

$\sin \theta = \frac{3\sqrt{23}}{16}$

3) $\tan \theta$

TDA

OR

hyp 20
adj. 16

$12^2 + x^2 = 20^2$
 $x^2 = 20^2 - 12^2$
 $\sqrt{x^2} = \sqrt{256}$
 $x = 16$

$\tan \theta = \frac{12}{16} = \frac{3}{4}$

$\tan \theta = \frac{3}{4}$

4) $\sec \theta$

CAH

hyp $7\sqrt{13}$
adj. 14

$\sec \theta = \frac{7\sqrt{13}}{14}$

$\sec \theta = \frac{\sqrt{13}}{2}$

Find the value of each. Round your answers to the nearest ten-thousandth.

5) $\tan 80^\circ$ 5.6713

6) $\cos 25^\circ$ 0.9063

7) $\csc 46^\circ$ 1.3902

8) $\sec 27^\circ$ 1.1223

9) $\cot 10^\circ$ 5.6713

Find the measure of each angle indicated. Using right triangle trigonometry. Round to the nearest tenth.

10)

opp 8
adj. 4

$\tan \theta = \frac{8}{4}$
 $\theta = \tan^{-1}\left(\frac{8}{4}\right)$
 $\theta = 63.4^\circ$

Find the measure of each side indicated. Using right triangle trigonometry. Round to the nearest tenth.

11)

adj 4 22° opp x

$$\frac{\tan 22^\circ = \frac{x}{4}}{1 \times 4}$$

$$x = 4 \tan 22^\circ$$

$x = 1.6$

12)

hyp x 31° adj 3.3

$$\frac{\cos 31^\circ = \frac{3.3}{x}}{1 \times x}$$

$$\frac{x \cos 31^\circ = 3.3}{\cos 31^\circ \times \cos 31^\circ}$$

$x = 3.8$

Solve each triangle (use right triangle trigonometry). Round answers to the nearest tenth.

13)

opp 5 48° adj a

$m\angle A = 42$
 $a = 4.5$
 $c = 6.7$

$$\frac{\tan 48^\circ = \frac{5}{a}}{1 \times a}$$

$$\frac{a \tan 48^\circ = 5}{\tan 48^\circ \times \tan 48^\circ}$$

$$a = 4.5$$

$$m\angle A = 180 - 90 - 48$$

$$m\angle A = 42$$

$$5^2 + 4.5^2 = c^2$$

$$\sqrt{45.25} = \sqrt{c^2}$$

$$6.7 = c$$

14)

hyp c 42° opp a

$m\angle B = 48$
 $a = 4.4$
 $c = 6.6$

$$\frac{\tan 42^\circ = \frac{a}{4.9}}{1 \times 4.9}$$

$$a = 4.9 \tan 42^\circ$$

$$a = 4.4$$

$$m\angle B = 180 - 90 - 42 = 48$$

$$4.9^2 + 4.4^2 = c^2$$

$$\sqrt{43.37} = \sqrt{c^2}$$

$$6.6 = c$$

15)

opp b 31° adj a 59° hyp 12

$m\angle A = 31$
 $a = 6.2$
 $b = 10.3$

$$m\angle A = 180 - 59 - 90 = 31$$

$$\frac{\cos 59^\circ = \frac{a}{12}}{1 \times 12}$$

$$12 \cos 59^\circ = a$$

$$6.2 = a$$

$$6.2^2 + b^2 = 12^2$$

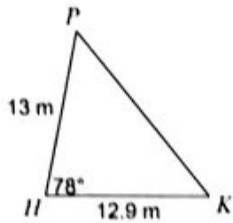
$$\sqrt{b^2} = \sqrt{45.56}$$

$$b = 10.3$$

$$A = \frac{1}{2} ab \sin C$$

Find the area of each triangle to the nearest tenth.

16)



$$A = \frac{1}{2} \cdot 13 \cdot 12.9 \sin 78$$

$$A = 82 \text{ m}^2$$

17) In $\triangle RST$, $s = 14$ km, $m\angle R = 73^\circ$, $t = 11$ km



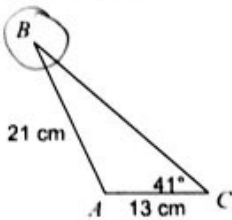
$$A = \frac{1}{2} \cdot 14 \cdot 11 \sin 73$$

$$A = 73.6 \text{ km}^2$$

Find each measurement indicated. Round your answers to the nearest tenth. Use the Law of Sines.

SSA

18) Find $m\angle B$



$$\frac{\sin B}{13} = \frac{\sin 41}{21}$$

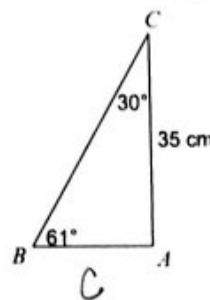
$$\frac{21 \sin B}{21} = \frac{13 \sin 41}{21}$$

$$\sin B = .40613$$

$$B = \sin^{-1}(.40613)$$

$$B = 24'$$

19) Find AB $\triangle C$



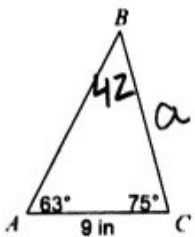
AAS

$$\frac{c}{\sin 30} = \frac{35}{\sin 61}$$

$$\frac{c \sin 61}{\sin 61} = \frac{35 \sin 30}{\sin 61}$$

$$c = 20 \text{ cm}$$

20) Find $BC = a$



$$\frac{a}{\sin 63} = \frac{42}{\sin 42}$$

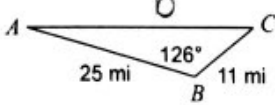
$$\frac{a \sin 42}{\sin 42} = \frac{42 \sin 63}{\sin 42}$$

$$a = 12 \text{ in}$$

$$180 - 63 - 75 = 42$$

Find each measurement indicated. Round your answers to the nearest tenth. Use the Law of Cosines.

21) Find AC SAS

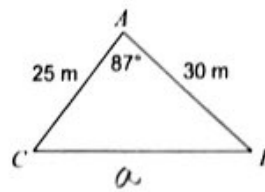


$$b^2 = 11^2 + 25^2 - 2(11)(25)\cos 126$$

$$\sqrt{b^2} = \sqrt{1069.2819}$$

$$b = 32.7 \text{ mi}$$

22) Find BE

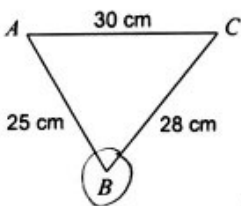


$$a^2 = 25^2 + 30^2 - 2(25)(30)\cos 87$$

$$\sqrt{a^2} = \sqrt{1446.9961}$$

$$a = 38 \text{ m}$$

23) Find $m\angle B$ SSS



$$30^2 = 28^2 + 25^2 - 2(28)(25)\cos B$$

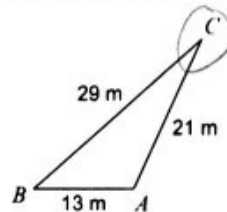
$$\frac{-509}{-2(28)(25)} = \frac{-2(28)(25)\cos B}{-2(28)(25)}$$

$$.363571 = \cos B$$

$$B = \cos^{-1}(.363571)$$

$$B = 68.7^\circ$$

24) Find $m\angle C$ SSS



$$13^2 = 29^2 + 21^2 - 2(29)(21)\cos C$$

$$\frac{-1113}{-2(29)(21)} = \frac{-2(29)(21)\cos C}{-2(29)(21)}$$

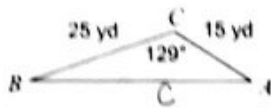
$$.913793 = \cos C$$

$$C = \cos^{-1}(.913793) = 24^\circ$$

$$C = 24^\circ$$

Solve each triangle. Round your answers to the nearest tenth.

25) SAS



$$\begin{aligned} C &= 36.4 \text{ yd} \\ m\angle A &= 32.3^\circ \\ m\angle B &= 18.7^\circ \end{aligned}$$

$$C^2 = 25^2 + 15^2 - 2(25)(15)\cos 129$$

$$C^2 = \sqrt{1321.9903}$$

$$C = 36.4 \text{ yd}$$

$$\frac{\sin A}{25} = \frac{\sin 129}{36.4}$$

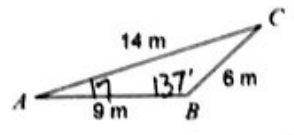
$$\frac{36.4 \sin A}{36.4} = \frac{25 \sin 129}{36.4}$$

$$\sin A = .53375$$

$$A = \sin^{-1}(.53375) = 32.3^\circ$$

$$m\angle B = 180 - 32.3 - 129 = 18.7^\circ$$

27) SSS



$$\begin{aligned} m\angle B &= 137^\circ \\ m\angle A &= 17^\circ \\ m\angle C &= 26^\circ \end{aligned}$$

$$14^2 = 6^2 + 9^2 - 2(6)(9)\cos B$$

$$\frac{79}{-2(6)(9)} = \frac{-2(6)(9)\cos B}{-2(6)(9)}$$

$$-.7314815 = \cos B$$

$$B = \cos^{-1}(-.7314815)$$

$$B = 137^\circ$$

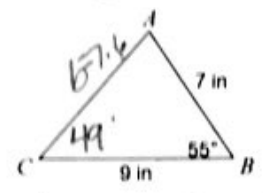
$$\frac{\sin 137}{14} = \frac{\sin A}{6}$$

$$\frac{14 \sin A}{14} = \frac{6 \sin 137}{14}$$

$$\sin A = .292285$$

$$A = \sin^{-1}(.292285) = 17^\circ$$

26) SAS



$$\begin{aligned} b &= 7.6 \text{ in} \\ m\angle A &= 76^\circ \text{ or } 75.9^\circ \\ m\angle C &= 49^\circ \end{aligned}$$

$$b^2 = 7^2 + 9^2 - 2(7)(9)\cos 55$$

$$\sqrt{b^2} = \sqrt{57.72937}$$

$$b = 7.6 \text{ in}$$

$$\frac{\sin C}{7} = \frac{\sin 55}{7.6}$$

$$\frac{7 \sin 55}{7.6} = \frac{7.6 \sin C}{7.6}$$

$$.754482 = \sin C$$

$$C = \sin^{-1}(.754482)$$

$$C = 49^\circ$$

$$m\angle A = 180 - 49 - 55 = 76^\circ \text{ or } 75.9^\circ$$

$$m\angle C = 180 - 17 - 137$$

$$m\angle C = 26$$

Solve each of the following stories. Be sure to define your variable, draw a picture, and show your work.

- 28) Mikey is looking up at John who is on the top of the cliff. The angle of elevation from Mikey to John is 28° . The cliff is 25 feet tall. How far away from the bottom of the cliff is Mikey to the nearest tenth?

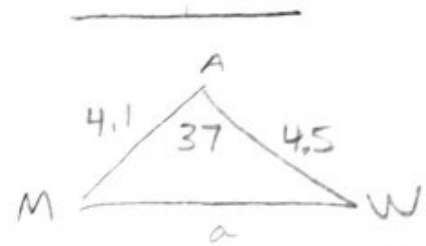


$$\frac{\tan 28 = 25}{1 \quad x}$$

$$\frac{x \tan 28 = 25}{\tan 28 \quad \tan 28}$$

$$\boxed{X = 47 \text{ ft}}$$

- 29) To find the distance between two small towns, Moroni and Wales, an electronic distance measuring instrument is placed on a hill from which both towns are visible. The instrument measured the distance to Moroni as 4.1 miles and the distance to Wales as 4.5 miles. The angle between the two lines of sight is 37° . What is the distance between the two towns to the nearest tenth?



$$a^2 = 4.1^2 + 4.5^2 - 2(4.1)(4.5) \cos 37$$

$$\sqrt{a^2} = \sqrt{7.5903}$$

$$\boxed{a = 2.8 \text{ miles}}$$

- 30) When you plant a tree, you need to support it against the wind. You do this by tying rope to the tree and staking it to the ground. You then tie another rope to the tree at the same spot, but stake it to the ground on the opposite side of the first stake. The stakes are 11 feet apart. If the angle of elevation from the ground to the where the rope is tied to the tree is 32° and 56° , how far up the tree are the ropes?



$$\frac{11}{\sin 92} = \frac{y}{\sin 56}$$

$$\frac{y \sin 92}{\sin 92} = \frac{11 \sin 56}{\sin 92}$$

$$y = 9.12$$

$$\sin 32 = \frac{x}{9.12}$$

$$x = 9.12 \sin 32$$

$$\boxed{X = 4.8 \text{ ft}}$$